

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0095; Project Identifier AD-2022-00054-T; Amendment 39-21947; AD 2022-04-05]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all The Boeing Company Model 757 airplanes and Model 767 airplanes. This AD was prompted by a determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band), and a recent determination that, during approach, landings, and go-arounds, as a result of this interference, certain airplane systems may not properly function, resulting in increased flightcrew workload while on approach with the flight director, autothrottle, or autopilot engaged. The FAA is issuing this AD to address 5G C-Band interference that could result in increased flightcrew workload and could lead to reduced ability of the flightcrew to maintain safe flight and landing of the airplane. This AD requires revising the limitations and operating procedures sections of the existing airplane flight manual (AFM) to incorporate specific operating procedures for landing distance calculations, instrument landing system (ILS) approaches, non-precision approaches, speedbrake deployment, and go-around and missed approaches, when in the presence of 5G C-Band interference as identified by Notices to Air Missions (NOTAMs). The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective February 14, 2022.

The FAA must receive comments on this AD by March 31, 2022.

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <https://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.

- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0095; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The street address for the Docket Operations is listed above.

FOR FURTHER INFORMATION CONTACT: For Model 757 airplanes, contact Jeffrey Palmer, Aerospace Engineer, Systems and Equipment Section, FAA, Los Angeles ACO Branch, 3960 Paramount Boulevard, Lakewood, CA 90712-4137; phone: 562-627-5351; email: jeffrey.w.palmer@faa.gov. For Model 767 airplanes, contact Dean Thompson, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3165; email: dean.r.thompson@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

In March 2020, the United States Federal Communications Commission (FCC) adopted final rules authorizing flexible use of the 3.7-3.98 GHz band for next generation services, including 5G and other advanced spectrum-based services.¹ Pursuant to these rules, C-Band wireless broadband deployment was permitted to occur in phases with the opportunity for operations in the lower 0.1 GHz of the band (3.7-3.8 GHz) in certain markets beginning on January 19, 2022. This AD refers to “5G C-Band” interference, but wireless broadband technologies, other than 5G, may use the same frequency band.² These other uses of the same frequency band are within the scope of this AD since they would introduce the same risk of radio altimeter interference as 5G C-Band.

The radio altimeter is an important aircraft instrument, and its intended function is to provide direct height-above-terrain/water information to a variety of aircraft systems. Commercial aviation radio altimeters operate in the 4.2-4.4 GHz band, which is separated by 0.22 GHz from the C-Band telecommunication systems in the 3.7-3.98 GHz band. The radio altimeter is more precise than a barometric altimeter and for that reason is used where aircraft height over the ground needs to be precisely measured, such as autoland, manual landings, or other low altitude operations. The receiver on the radio altimeter is typically highly accurate, however it may deliver erroneous results in the presence of out-of-band radio frequency emissions from other frequency bands. The radio altimeter must detect faint signals reflected off the ground to measure altitude, in a manner similar to radar. Out-of-band signals could significantly degrade radio altimeter functions during critical phases of flight, if the altimeter is unable to sufficiently reject those signals.

The FAA issued AD 2021-23-12, Amendment 39-21810 (86 FR 69984, December 9, 2021) (AD 2021-23-12) to address the effect of 5G C-Band interference on all transport and commuter category airplanes equipped with a radio (also known as radar) altimeter. AD 2021-23-12 requires revising the limitations section of the existing AFM to incorporate limitations prohibiting certain operations, which require radio altimeter data to land in low visibility conditions, when in the presence of 5G C-

¹ The FCC's rules did not make C-Band wireless broadband available in Alaska, Hawaii, and the U.S. Territories.

² The regulatory text of the AD uses the term “5G C-Band” which, for purposes of this AD, has the same meaning as “5G”, “C-Band” and “3.7-3.98 GHz.”

Band interference as identified by NOTAM. The FAA issued AD 2021-23-12 because radio altimeter anomalies that are undetected by the automation or pilot, particularly close to the ground (e.g., landing flare), could lead to loss of continued safe flight and landing.

Since the FAA issued AD 2021-23-12, Boeing has continued to evaluate potential 5G C-Band interference on aircraft systems that rely on radio altimeter inputs. Boeing issued Boeing Multi Operator Message MOM-MOM-22-0022-01B(R2), dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBC-67 R1, "Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States," dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBCC-72 R1, "Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States," dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBC-86 R1, "Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States," dated February 1, 2022; and Boeing Flight Crew Operations Manual Bulletin TBC4-33 R1, "Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States," dated February 1, 2022; for Model 757 and 767 airplanes.

Based on Boeing's data, the FAA identified an additional hazard presented by 5G C-Band interference on The Boeing Company Model 757 and 767 airplanes. The FAA determined anomalies due to 5G C-Band interference may affect multiple other airplane systems using radio altimeter data, regardless of the approach type or weather. These anomalies may not be evident until very low altitudes. Impacted systems include, but are not limited to, autopilot flight director system; autothrottle system; flight controls; flight instruments; traffic alert and collision avoidance system (TCAS); ground proximity warning system (GPWS); and configuration warnings.

In the event of 5G C-Band interference, landing performance and flightcrew workload can be adversely impacted. This may have multiple effects, including:

- Autopilot Flight Director System: NO AUTOLAND Autopilot Status Annunciation may be shown; autopilot may not engage; autopilot disconnect may occur when LAND 2 or LAND 3 status is shown; the flight directors may provide erroneous guidance during ILS approaches; autoland runway alignment may not occur or may activate earlier or later than expected; autoland flare may not occur, however, FLARE mode can be erroneously annunciated on the FMA (flight mode annunciation); or go-around mode may not be available.
- Autothrottle System: Autothrottle can remain in SPD (speed) mode and may advance to maintain speed during flare instead of reducing the thrust to IDLE; or autothrottle may retard to idle prematurely in the flare.
- Flight Controls: Automatic speedbrake deployment may not occur after touchdown (for Model 757 and 767 models with Yaw Damper Stabilizer Trim module (YSM)); or SPEEDBRAKES EXT Caution message may not be available.
- Flight Instruments: The RA (radio altimeter) indication may not be shown; the RADIO minimums indications (flashing or turning amber) may not be shown or may be erroneous; the rising runway symbol may not be shown; the localizer deviation alert amber scale and flashing pointer may not be shown (deviation indications are still available); or the glideslope deviation alert amber scale and flashing pointer may not be shown (deviation indications are still available).
- TCAS: TCAS alerts may not be available (TCAS alerts that do occur will be valid); or TCAS inhibits for resolution advisories may be erroneous.
- GPWS: GPWS alerts may not be available or may be erroneous (although look-ahead terrain alerting remains available); radio altimeter-based altitude and minimums aural callouts during approach may not be available or erroneous; or windshear detection systems (predictive and reactive) may be inoperative.
- Configuration Warnings: Erroneous landing gear configuration warning may occur.

- Considerations for Dispatch: For Model 757 and 767 airplanes with YSM, adjust operational (time of arrival) landing distance for manual speedbrakes. For airplanes without YSM, no impacts on dispatch landing performance calculations.
- Other simultaneous flight deck effects associated with the 5G C-Band interference could increase pilot workload.

These effects may cause erroneous indications and annunciations, as well as conflicting information, being provided to the flightcrew during a critical phase of flight. This could lead to reduced ability of the flightcrew to maintain safe flight and landing of the airplane, and is an unsafe condition.

To address this unsafe condition, this AD mandates procedures for operators to incorporate specific operating procedures for landing distance calculations, ILS approaches, non-precision approaches, speedbrake deployment, and go-around and missed approaches, when in the presence of 5G C-Band interference as identified by NOTAMs.

The FAA notes that for those airplanes equipped with YSM, the 5G interference to the radio altimeter creates an error to the YSM which causes the speedbrakes to not automatically deploy on landing; the flightcrew must manually deploy the speedbrakes when this occurs. Further, the additional landing distance calculation is required due to the differences in manual deployment versus automatic deployment during landing.

Finally, the FAA notes that AD 2021-23-12 remains in effect and thus prohibits certain ILS approaches. Thus, this AD addresses procedures applicable only to those ILS approaches not prohibited by AD 2021-23-12.

The FAA is issuing this AD to address the unsafe condition on these products.

FAA's Determination

The FAA is issuing this AD because the agency has determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

AD Requirements

This AD requires revising the limitations and operating procedures sections of the existing AFM to incorporate specific operating procedures for landing distance calculations, ILS approaches, non-precision approaches, speedbrake deployment, and go-around and missed approaches, when in the presence of 5G C-Band interference as identified by NOTAMs.

Compliance With AFM Revisions

Section 91.9 prohibits any person from operating a civil aircraft without complying with the operating limitations specified in the AFM. FAA regulations also require operators to furnish pilots with any changes to the AFM (14 CFR 121.137) and pilots in command to be familiar with the AFM (14 CFR 91.505).

Interim Action

The FAA considers this AD to be an interim action. If final action is later identified, the FAA might consider further rulemaking.

Justification for Immediate Adoption and Determination of the Effective Date

Section 553(b)(3)(B) of the Administrative Procedure Act (APA) (5 U.S.C. 551 et seq.) authorizes agencies to dispense with notice and comment procedures for rules when the agency, for "good cause," finds that those procedures are "impracticable, unnecessary, or contrary to the public

interest.” Under this section, an agency, upon finding good cause, may issue a final rule without providing notice and seeking comment prior to issuance. Further, section 553(d) of the APA authorizes agencies to make rules effective in less than thirty days, upon a finding of good cause.

An unsafe condition exists that requires the immediate adoption of this AD without providing an opportunity for public comments prior to adoption. The FAA has found that the risk to the flying public justifies forgoing notice and comment prior to adoption of this rule because the FAA determined that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 5G C-Band, and a determination that, during approach, landings, and go-arounds, as a result of this interference, certain airplane systems may not properly function, resulting in increased flightcrew workload while on approach with the flight director, autothrottle, or autopilot engaged. This increased flightcrew workload could lead to reduced ability of the flightcrew to maintain safe flight and landing of the airplane. The urgency is based on the hazard presented by 5G C-Band interference, and on C-Band wireless broadband deployment, which began in phases with operations on January 19, 2022. Accordingly, notice and opportunity for prior public comment are impracticable and contrary to the public interest pursuant to 5 U.S.C. 553(b)(3)(B).

In addition, the FAA finds that good cause exists pursuant to 5 U.S.C. 553(d) for making this amendment effective in less than 30 days, for the same reasons the FAA found good cause to forgo notice and comment.

Comments Invited

The FAA invites you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under ADDRESSES. Include Docket No. FAA-2022-0095 and Project Identifier AD-2022-00054-T at the beginning of your comments. The most helpful comments reference a specific portion of the final rule, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this final rule because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to <https://www.regulations.gov>, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this final rule.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this AD contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this AD, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this AD. Submissions containing CBI for Model 757 airplanes should be sent to Jeffrey Palmer, Aerospace Engineer, Systems and Equipment Section, FAA, Los Angeles ACO Branch, 3960 Paramount Boulevard, Lakewood, CA 90712-4137; phone: 562-627-5351; email: jeffrey.w.palmer@faa.gov. Submissions containing CBI for Model 767 airplanes should be sent to Dean Thompson, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3165; email: dean.r.thompson@faa.gov. Any commentary that the FAA receives that is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Regulatory Flexibility Act

The requirements of the Regulatory Flexibility Act (RFA) do not apply when an agency finds good cause pursuant to 5 U.S.C. 553 to adopt a rule without prior notice and comment. Because the FAA has determined that it has good cause to adopt this rule without notice and comment, RFA analysis is not required.

Costs of Compliance

The FAA estimates that this AD affects 1,138 airplanes of U.S. registry. The FAA estimates the following costs to comply with this AD:

Estimated Costs				
Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
AFM revision	1 work-hour × \$85 per hour = \$85	\$0	\$85	\$96,730

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866, and
- (2) Will not affect intrastate aviation in Alaska.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39—AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:



2022-04-05 The Boeing Company: Amendment 39-21947; Docket No. FAA-2022-0095; Project Identifier AD-2022-00054-T.

(a) Effective Date

This airworthiness directive (AD) is effective February 14, 2022.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all The Boeing Company airplanes identified in paragraphs (c)(1) and (2) of this AD, certificated in any category.

(1) Model 757-200, -200PF, -200CB, and -300 series airplanes.

(2) Model 767-200, -300, -300F, -400ER, and -2C series airplanes.

(d) Subject

Air Transport Association (ATA) of America Code 34, Navigation.

(e) Unsafe Condition

This AD was prompted by a determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band), and a determination that, during approach, landings, and go-arounds, as a result of this interference, certain airplane systems may not properly function, resulting in increased flightcrew workload while on approach with the flight director, autothrottle, or autopilot engaged. The FAA is issuing this AD to address 5G C-Band interference that could result in increased flightcrew workload and could lead to reduced ability of the flightcrew to maintain safe flight and landing of the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Airplane Flight Manual (AFM) Revision

(1) Within 2 days after the effective date of this AD: Revise the Limitations Section of the existing AFM to include the information specified in figure 1 to paragraph (g)(1) of this AD. This may be done by inserting a copy of figure 1 to paragraph (g)(1) of this AD into the Limitations Section of the existing AFM.

Figure 1 to paragraph (g)(1) – AFM Limitations Revision

(Required by AD 2022-04-05)

Radio Altimeter 5G C-Band Interference, Approach, Landing, and Go-Around

The following limitations are required for dispatch or release to airports, and approach, landing, and go-around on runways, in U.S. airspace in the presence of 5G C-Band wireless broadband interference as identified by NOTAM (NOTAMs will be issued to state the specific airports or approaches where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference).

Approach, Landing, and Go-Around

Operators must use the Radio Altimeter 5G C-Band Interference, Approach, Landing, and Go-Around procedure contained in the Operating Procedures Section of this AFM.

(2) Within 2 days after the effective date of this AD: Revise the Operating Procedures Section of the existing AFM to include the information specified in figure 2 to paragraph (g)(2) of this AD. This may be done by inserting a copy of figure 2 to paragraph (g)(2) of this AD into the Operating Procedures Section of the existing AFM.

Figure 2 to paragraph (g)(2) – AFM Operating Procedures Revision

(Required by AD 2022-04-05)

Radio Altimeter 5G C-Band Interference, Approach, Landing, and Go-Around

Landing Distance Calculations

For airplanes with Yaw Damper Stabilizer Trim module (YSM), adjust the operational (time of arrival) landing distance for manual speedbrake deployment if MAX MANUAL braking is required. When using autobrakes, no correction is needed since the calculations already take into account that manual speedbrake deployment may be needed.

ILS Approaches

For ILS approaches not prohibited by AD 2021-23-12, disconnect the autopilot and autothrottle, and place both flight director switches to OFF prior to glideslope intercept.

Non-Precision Approaches

Non-precision instrument approaches can be conducted using VNAV or V/S with flight directors, autopilot, and autothrottle to published minimums.

During Landing

For airplanes with Yaw Damper Stabilizer Trim module (YSM), if MAX MANUAL braking is required, manually deploy the speedbrake if it does not deploy automatically.

During Go-Around and Missed Approach

If the flight director is ON, cycle to OFF, then ON, as needed.
If the flight director is OFF, turn ON, as needed.

Note 1 to paragraph (g)(2): Guidance for accomplishing the actions required by paragraph (g)(2) of this AD can be found in Boeing Multi Operator Message MOM-MOM-22-0022-01B(R2), dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBC-67 R1, “Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States,” dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBCC-72 R1, “Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States,” dated February 1, 2022; Boeing Flight Crew Operations Manual Bulletin TBC-86 R1, “Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States,” dated February 1, 2022; and Boeing Flight Crew Operations Manual Bulletin TBC4-33 R1, “Radio Altimeter Anomalies due to 5G C-Band Wireless Broadband Interference in the United States,” dated February 1, 2022.

(h) Alternative Methods of Compliance (AMOCs)

(1) For Model 757 airplanes: The Manager, Los Angeles ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (i)(1) of this AD. Information may be emailed to: 9-ANM-LAACO-AMOC-Requests@faa.gov. For Model 767 airplanes: The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or responsible Flight Standards Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (i)(2) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the responsible Flight Standards Office.

(3) AMOCs approved for AD 2021-23-12, Amendment 39-21810 (86 FR 69984, December 9, 2021) providing relief for specific radio altimeter installations are approved as AMOCs for the provisions of this AD.

(i) Related Information

(1) For more information about this AD for Model 757 airplanes, contact Jeffrey W. Palmer, Aerospace Engineer, Systems and Equipment Section, FAA, Los Angeles ACO Branch, 3960 Paramount Boulevard, Lakewood, CA 90712-4137; phone: 562-627-5351; email: jeffrey.w.palmer@faa.gov.

(2) For more information about this AD for Model 767 airplanes, contact Dean Thompson, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3165; email: dean.r.thompson@faa.gov.

(3) For service information identified in this AD that is not incorporated by reference, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminister Blvd., MC 110 SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; internet <https://www.myboeingfleet.com>.

(j) Material Incorporated by Reference

None.

Issued on February 7, 2022.

Lance T. Gant,

Director, Compliance & Airworthiness Division, Aircraft Certification Service.

[FR Doc. 2022-03144 Filed 2-10-22; 11:15 am]